Bellota Fish Ladder Operating Criteria (Non-Irrigation Season)

System Components:

1. Bellota Weir (Concrete) Apron
2. Temporary 2-foot Dam & Upper CDFG Fish Ladder
3. Temporary 2-foot Dam & Lower CFF Fish Ladder

General Operating Conditions:

Once the irrigation season is over and the 6-foot flashboard dam is removed from Bellota Weir (usually before November 1), SEWD installs a 2-foot high temporary dam at the upstream edge of the Bellota Weir to provide the hydraulic head needed for the district to divert Calaveras River water into the Bellota intake for the district's water treatment plant (WTP), or into the Old Calaveras River channel for groundwater recharge purposes. Most of the temporary dam consists of flashboards supported by temporary braces supported by stationary anchors. However, a row of sandbags extends from the flashboards approximately 10-15 feet to the right bank (looking downstream) in order to act as a pressure regulator during flow increases (i.e., whenever flows increase and begin to exert too much pressure on the temporary dam, the sandbags are dislodged first which relieves the stress on the remaining structure and prevents the loss of flashboards at moderately high flows, but both sandbags and flashboards are dislodged at high flows). SEWD also installs a fish ladder provided by the California Department of Fish and Game (CDFG) on the face of the temporary dam to provide upstream fish passage opportunities from the pool on the apron of Bellota Weir to the pool upstream of the Bellota Weir.

To complement the upper CDFG ladder and improve upstream fish passage, a second 2-foot temporary dam is also installed at the downstream side of the Bellota Weir apron. This lower dam also incorporates a lower fish ladder provided by the Anadromous Fish Restoration Program and installed by the California Fish Foundation (CFF). The lower ladder allows fish to pass over the initial portion of the weir structure and onto the apron of the weir, where fish can rest and orient themselves in the pool created by the lower 2-foot dam before entering the second CDFG ladder.

Fish passage is not always available when the CDFG and CFF ladders are installed and is dependent on sufficient flows at the weir (i.e., flows greater than 10 cfs are needed for the CDFG ladder to function properly according to CFDG). Also, continuous flows in the river between Bellota and the confluence with the San Joaquin River-Delta via the Mormon Slough route are needed to allow fish to migrate between Bellota and the Delta. Whenever fish passage over the weir is not possible (i.e., flows are less than 10 cfs and/or there are no continuous flows between Bellota and the San Joaquin River-Delta confluence via the Mormon Slough route[1]), a board is placed at the upstream side of the CDFG fish ladder to essentially complete the 2-foot dam and provide the hydraulic head needed for the diversion facility. Whenever there is enough flow available (i.e., greater than 10 cfs and there are continuous flows between Bellota and the confluence), the

[1] In the event that adult salmonids are observed in the pool below Bellota weir, the ladder will remain open regardless of current flow connectivity to the confluence.

board is removed from the ladder to provide fish passage. Also, at flows above 10 cfs, the removal of the board from the ladder does not interfere with maintaining enough hydraulic head to operate the diversion facility.

In order to maximize the amount of low flows directed into the fish ladders at low flows, beginning in November of 2004 plastic sheeting will be placed on the upstream side of the flashboards to reduce leakage that occurs due to gaps in the flashboards.

Due to flood control concerns and the current configuration of the Bellota Weir, no permanent fish passage structures have been installed at the Bellota Weir location. Runoff levels at the Bellota Weir in excess of 100 cfs have the potential to damage the temporary dam/ladder structures described above. However, at these higher flow levels, upstream fish passage is possible over the 2-foot high dams, assuming there is continuous flow downstream of Bellota to the San Joaquin River-Delta confluence. Therefore, the integrity of these temporary structures is appropriate for their intended purpose which is to provide additional fish passage opportunities at the weir during periods when natural flows allow fish to migrate between Bellota and the Delta, yet flows are not high enough to allow passage directly over the weir without assistance from a fish passage structure. These temporary dams/ladders are being used to increase fish passage opportunities during the interim period occurring prior to development and implementation of a permanent fish passage solution at Bellota.

Specific Operating Criteria. Once the temporary dams/ladders have been installed, the General Manager and the WTP Operator must determine when to remove the board from the upper CDFG ladder to allow for fish passage through the ladder and when to replace the board to allow for uninterrupted water diversion. This determination is based on several critical factors including:

1. Is Mormon Slough flow continuous downstream from Bellota to the confluence with the San Joaquin River-Delta?
2. Is runoff from the Calaveras River across Bellota Weir and into Mormon Slough in excess of 10 cfs?
3. Is runoff expected to be continuously ≥ 10 cfs for at least the next 24-hours.
4. Are there indications of adult *O. mykiss* present in the pool below the Bellota Weir?
5. What is the current demand for the Bellota pipeline (i.e., the municipal water treatment plant intake), and the Old Calaveras River headworks (i.e., groundwater recharge area)?

If the answer to the above critical factor questions #1 through #3 are affirmative, then the board in the upper fish ladder will be removed. Whenever any one of these three critical factor questions is answered in the negative (with the exception of *O. mykiss* presence observed in the pool below the Bellota Weir below), the board in the upper fish ladder will be either kept in place or installed. Since negative responses to any of questions 1-3 indicate inadequate upstream passage opportunities for fish in Mormon Slough, the

replacement of the board at the ladder will not have a detrimental impact on upstream passage of *O. mykiss* at Bellota.

If there is evidence of adult *O. mykiss* in the pool below Bellota Weir at any time, SEWD will (1) notify NOAA Fisheries and (2) remove the board in the upper ladder, as long as flows greater than 10 cfs are available to operate the ladder regardless of whether flows are continuous between Bellota and the confluence. On the following day, the board will be re-installed in the upper ladder, unless there is evidence that adult *O. mykiss* are still present below the weir. If adult *O. mykiss* are still present below the weir, NOAA Fisheries will be consulted and SEWD and NOAA Fisheries will determine additional actions collectively.

Critical factor questions #5 must be answered in order to understand the affect of removing and replacing the board in the upper fish ladder. The General Manager and the WTP Operator on duty at the time of removing and replacing the board in the upper fish ladder should be informed.

Maintenance Criteria. During high flow events, the flashboards, sandbags, and/or plastic sheeting may become dislodged and need to be replaced. Every effort will be made to replace these items as soon as possible; however, replacement will be dependent on flows receding to a level that assures the safety of maintenance personnel. Once flows decrease to approximately 20 cfs, any dislodged flashboards, sandbags, and/or plastic sheeting will be replaced.